

EXHIBIT 1

Thomas B Kepler, PhD

Department of Biostatistics & Bioinformatics
Department of Immunology
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CONTACT

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EDUCATION

Postdoctoral Fellowship	Santa Fe Institute, Alan S. Perelson, sponsor	1991-1992
Postdoctoral Fellowship	Brandeis University, Eve Marder, supervisor	1989-1991
Ph.D. Physics	Brandeis University, Laurence F. Abbott, adviser	1989
B.A. Physics	University of Massachusetts at Boston	1985

PRIMARY ACADEMIC APPOINTMENTS

Chief, Division of Computational Biology, Department of Biostatistics and Bioinformatics	Duke University Medical Center	5/03-pres.
Professor, Department of Biostatistics and Bioinformatics	Duke University Medical Center	8/02-pres.
Interim Director, Center for Bioinformatics and Computational Biology	Duke University	4/03-4/05
Vice President for Academic Affairs	The Santa Fe Institute	7/00-7/02
Associate Professor, Biomathematics Graduate Program Statistics Department	North Carolina State University	6/98-6/00
Assistant Professor, Biomathematics Graduate Program Statistics Department	North Carolina State University	1/93-6/98

SECONDARY ACADEMIC APPOINTMENTS AND MEMBERSHIPS

Institute for Statistics and Decision Sciences, Professor	Duke University	11/04-10/07
Biomolecular and Tissue Engineering Program, member	Duke University	10/03-pres.

Department of Immunology, Professor	Duke University Medical Center	11/02-pres.
Center for Nonlinear and Complex Systems, member	Duke University	10/02-pres.
Human Vaccine Institute, member	Duke University Medical Center	8/02-pres.
Center for Bioinformatics and Computational Biology, member	Duke University	8/02-pres.
Genomic Sciences Program, faculty	North Carolina State University	2/00-6/00
Bioinformatics Graduate Program, faculty	North Carolina State University	9/99-6/00
External Faculty member	Santa Fe Institute	1/94-6/00;
The Center for Research in Scientific Computing, member	North Carolina State University	8/02-pres 10/94-6/00
Interdepartmental Program in Immunology, faculty	North Carolina State University	10/94-6/00

COMMITTEE MEMBERSHIP AND SERVICE

Scientific Working Group, NIAID Systems Biology of Infectious Disease	National Institute of Allergy and Infectious Disease	9/09-pres.
Board of Scientific Counselors (ad-hoc member)	National Institute of Allergy and Infectious Disease	5/08
Science Advisory Board	Immune Response Consortium, MIT	5/07-pres.
Scientific Working Group, NIAID Proteomics Research Centers	National Institutes of Health	4/07-pres.
Executive Committee, Duke Center for AIDS Research	Duke University Medical Center	8/05-pres.
Scientific Working Group, Viral Bioinformatics Resource Center	National Institutes of Health	12/04-pres.
Appointments, Promotion and Tenure Committee; Department of Biostatistics and Bioinformatics	Duke University	9/03-pres.
Monitoring Committee, Center for Demographic Studies	Duke University Medical Center	8/03-8/05
Steering committee, Center for Computational Science, Engineering and Medicine	Duke University	10/02-4/07

Executive Committee, Center for Bioinformatics and Computational Biology	Duke University	10/02-pres.
External Advisory Committee, Center for Evolutionary and Theoretical Immunology	University of New Mexico	9/03-pres
Program Director, Innovation in Natural, Experimental and Applied Evolution	Santa Fe Institute	9/02-9/03
Local Development Committee	Statistical and Applied Mathematical Sciences Institute (SAMSI)	9/02-8/05
Committee on Applied and Theoretical Statistics	National Research Council. National Academy of Science	9/01-6/05
Scientific Advisory Board	Ribonomics, Inc.	9/01-8/04
Life Sciences Representative	SIAM News (Society for Industrial and Applied Mathematics)	3/01-pres.
Director of the Biomathematics Graduate Program	North Carolina State University	7/99-6/00
Associate Editor	The Journal of Immunology	8/95-6/00

HONORS & AWARDS

National Young Investigator Award	National Science Foundation	1993
Gillette Fellowship	Brandeis University	1987
David J. Falkoff Graduate Student Award	Brandeis University	1986
Department Prize in Physics	University of Massachusetts/Boston	1985

PUBLICATIONS

Li L, He Q, Garland A, Yi Z, Aybar LT, Kepler TB, Frelinger JA, Wang B, Tisch R. (2009) beta cell-specific CD4+ T cell clonotypes in peripheral blood and the pancreatic islets are distinct. *J Immunol.* 18:7585-91.

Ciupe SM, BH Devlin, ML Markert, TB Kepler (2009) The dynamics of T-cell receptor repertoire diversity following thymus transplantation for DiGeorge Anomaly. *PLOS Comp. Biol.* 5: e1000396.

Liao H-X, Levesque MC, Nagel A, Dixon A, Zhang R, Walter E, Parks R, Whitesides J, Marshall DJ, Hwang K-K, Yang Y, Chen X, Gao F, Munshaw S, Kepler TB, Denny T, Moody MA, Haynes BF (2009) High-throughput isolation of immunoglobulin genes from single human B cells and expression as monoclonal antibodies. *J. Virol. Meth.* **158**: 171-9.

Volpe JM, TB Kepler (2009) Genetic correlates of autoreactivity and autoreactive potential in human Ig heavy chains. *Immunome Research* **5**: 1.

Ji C, D Merl, TB Kepler and M West (2009) Spatial Mixture Modelling for Unobserved Point Processes: Application to Immunofluorescence Histology. *Bayesian Analysis* **4**: 1-20.

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- Barefoot B, NJ Thornburg, DH. Barouch, J-S Yu, C Sample, RE Johnston, HX Liao, TB Kepler, BF Haynes, and E Ramsburg (2008) Comparison of multiple vaccine vectors in a single heterologous prime boost trial. *Vaccine*, **26**: 6108-18.
- Frelinger J, TB Kepler, C Chan (2008) Flow: Statistics, visualization and informatics for flow cytometry, *Source Code Biol Med*, **3**:10.
- Chan C, F Feng, D Foster, M West, and TB Kepler (2008) Statistical mixture modeling for cell subtype identification in flow cytometry. *Cytometry A*, **73**: 693-701.
- Buckley KM, S Munshaw, TB Kepler, and LC Smith (2008) The 185/333 gene family is a rapidly diversifying host-defense gene cluster in the purple sea urchin, *Strongylocentrotus purpuratus*. *J Mol Biol*, **13**: 912-28. (Joint senior authors)
- Riddle DS, Miller PJ, Vincent BG, Kepler TB, Maile R, Frelinger JA, Collins EJ (2008) Rescue of cytotoxic function in the CD8alpha knockout mouse by removal of MHC class II. *Eur J Immunol*, **38**: 1511-21.
- Mitha FH, TA Lucas, F Feng, TB Kepler and C Chan (2008) The Multiscale Systems Immunology Project: Software for Cell-Based Immunological Simulation *Source Code Biol. Med.*, **3**: 6.
- Munshaw S, Kepler TB. (2008) An Information-Theoretic Method for the Treatment of Plural Ancestry in Phylogenetics. *Mol Biol Evol*, **25**: 1199-208.
- Volpe JM, TB Kepler (2008) Large-scale analysis of human heavy chain V(D)J recombination patterns. *Immunome Res*. **4**:3
- Ray S, TB Kepler (2007) Amino acid biophysical properties in the statistical prediction of peptide-MHC class I binding. *Immunome Res*. **3**: 9
- Kepler TB, Chan C (2007) Spatiotemporal programming of a simple inflammatory process. *Immunol. Rev.*, **216**: 153-163. (invited)
- Chan C, TB Kepler (2007) Computational immunology - from bench to virtual reality. *Ann Acad Med Singapore* **36** :123-5 (invited review)
- Markert ML, Devlin BH, Alexieff MJ, Li J, McCarthy EA, Gupton SE, Chinn IK, Hale LP, Kepler TB, He M, Sarzotti M, Skinner MA, Rice HE, Hoehner JC (2007) Review of 54 patients with complete DiGeorge anomaly enrolled in protocols for thymus transplantation: outcome of 44 consecutive transplants. *Blood*. **109**:4539-47
- Culton DA, Nicholas MW, Bunch DO, Zhen QL, Kepler TB, Dooley MA, Mohan C, Nachman PH, Clarke SH (2007) Similar CD19 Dysregulation in Two Autoantibody-Associated Autoimmune Diseases Suggests a Shared Mechanism of B-Cell Tolerance Loss. *J. Clin. Immunol.*, **27**:53-68.
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- Liu C, He M, Rooney B, Kepler TB, Chao NJ (2006) Longitudinal analysis of T-cell receptor variable beta chain repertoire in patients with acute graft-versus-host disease after allogeneic stem cell transplantation. *Biol Blood Marrow Transplant* **12**:335-45.

- Volpe JM, LG Cowell, TB Kepler (2006) SoDA: implementation of a 3D alignment algorithm for inference of antigen receptor recombinations. *Bioinformatics* **22**:438-44.
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- Tomfohr JK, J Lu, TB Kepler (2005) Pathway Level Analysis of Gene Expression using Singular Value Decomposition, *BMC Bioinformatics* **6**: 225-234.
- He M, JK Tomfohr, BH Devlin, M Sarzotti, ML Markert, TB Kepler (2005) SpA: Web-accessible Spectratype Analysis: data management, statistical analysis and visualization. *Bioinformatics*, **15**: 3697-9.
- Kepler TB (2005) Microsimulation of Inducible Reorganization in Immunity, in *Complex Systems Science in BioMedicine (International Topics in Biomedical Engineering)*, eds. TS Deisboeck, YJ Kresh, Plenum US.
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Kepler TB, L Crosby and KT Morgan (2002) Normalization and analysis of DNA microarrays by self-consistency and local regression. *Genome Biology* **3**(7): research0037.1-0037.12.

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Kepler TB and M Oprea (2001) Improved inference of mutation rates: I. An Integral Representation of the Luria-Delbrück distribution. *Theor. Pop. Biol.* **59**: 41-48

Oprea M and TB Kepler (2001) Improved inference of mutation rates: II. Generalization of the Luria-Delbrück distribution for realistic cell cycle time distributions. *Theor. Pop. Biol.* **59**: 49-59

Radmacher MD and TB Kepler (2001) Waiting times to appearance and dominance of advantageous mutants: Estimation based on the likelihood. *Math. Biosci.* **170**: 57-78

Elston T and TB Kepler (2001) A linear two-state model with complex dynamics. *Phys. Lett. A* **280**: 204-208

Oprea M, LG Cowell and TB Kepler (2001) Somatic hypermutation closely resembles meiotic mutation. *J. Immunol.* **166**: 892-899

Zavolan M and TB Kepler (2001) Statistical inference of sequence-dependent mutation rates. *Curr. Opinion Gen. Dev.* **11**: 612-5. (review)

Buchman TG, J P Cobb, AS Lapedes, TB Kepler (2001) Complex Systems Analysis: A Tool for Shock Research. *Shock* **16**: 248-51. (editorial)

Crosby LM, KS Hyder, AB DeAngelo, TB Kepler, B Gaskill GR Benavides, L Yoon, and KT Morgan (2000) Morphologic Analysis Correlates with Gene Expression Changes in Cultured F344 Rat Mesothelial Cells. *Toxicol. Appl. Pharmacol.*, **169**: 205-221

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Keys DA, DG Wallace, TB Kepler and RB Conolly (1999) Quantitative estimation of alternative mechanisms of blood and testes deposition of Di(2-ethylhexyl) Phthalate and Mono(2-ethylhexyl) Phthalate in rats. *Toxicological Sciences* **49**: 172-185

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- Gangi-Petersen L, D Sorscher, TB Kepler, and B Mitchell (1999). Nucleotide pool imbalance and adenosine deaminase deficiency induce alterations of N-region insertion during V(D)J recombination. *J. Clin. Invest.* **103**: 833-841
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- Radmacher MD, G Kelsoe and TB Kepler (1998) Predicted and inferred waiting times for key mutations in the germinal centre reaction: Evidence for stochasticity in selection. *Immunol. Cell Biol.* **76**: 373-381
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- Cowell LG, L Crowder and TB Kepler (1998) Density-dependent prenatal androgen exposure as an endogenous mechanism for the generation of cycles in small mammal populations. *J. Theor. Biol.* **190**: 93-106
- Kepler TB and S Bartl (1998) Plasticity under somatic mutation in Immunoglobulins and T-cell receptors. *Curr. Top. Microbiol. Immunol.* **229**:149-162. (review)
- Kepler TB (1997) Codon bias and plasticity in immunoglobulins. *Mol. Biol. Evol.* **14**: 637-643
- Kepler TB (1997) Oligomerization and PrP^{Sc} Stability in Prion Propagation: A Mathematical Analysis. in *Advances in Mathematical Population Dynamics: Molecules, Cells and Man*, Eds. O. Arino, D. Axelrod and M. Kimmel (World Scientific, Singapore)
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- Kepler TB and AS Perelson (1995) Modeling and Optimization of Populations Subject to Time-Dependent Mutation. *Proc. Natl. Acad. Sci. USA* **92**: 8219-8222
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- Kepler TB and AS Perelson (1993) Somatic hypermutation in B cells: An optimal control treatment. *J. Theor. Biol.* **164**: 37-64
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- Kepler TB, LF Abbott and E Marder (1992) Reduction of conductance-based neuron models. *Biol. Cyb.* **66**: 381-387
- Marder E, JM Weimann, TB Kepler and LF Abbott (1992) Computational implications of a serotonin-sensitive region of axonal membrane on a dual-function motor neuron. in *Analysis and Modeling of Neural Systems II*, F Eeckman, ed. (Kluwer Academic Press, Norwell) pp. 377-390
- Kepler TB, ML Kagan and IR Epstein (1991) Geometric phases in dissipative systems. *CHAOS* **1**: 455-461
- Kepler TB and ML Kagan (1991) Geometric phase shifts under adiabatic changes in classical dissipative systems. *Phys. Rev. Lett.* **66**: 847-849
- Kagan ML, TB Kepler and IR Epstein (1991) Geometric phase shifts in chemical oscillators *Nature* 349 506-508
- Kepler TB, LF Abbott and E Marder (1991) Order reduction for dynamical systems describing the behavior of complex neurons. in *Advances in Neural Information Processing Systems* 3, RP Lippmann, JE Moody and DS Touretzky, eds. (Morgan Kaufmann, San Mateo)
- Kepler TB, S Datt, RB Meyer and LF Abbott (1990) Chaos in a neural network circuit. *Physica D* **46**: 449-457
- Kepler TB (1990) Domains of attraction and the density of static metastable states in single-pattern iterated neural networks. *J. Phys. A: Math. Gen.* **24**: 1083-1092
- Kepler TB, LF Abbott and E Marder (1990) The effect of electrical coupling on the frequency of model neuronal oscillators. *Science* **248**: 83-85
- Marder E, LF Abbott, TB Kepler and S Hooper (1990) Modification of oscillator function by electrically coupled neurons in *Induced Rhythmicities in the Brain*, T Bullock and E Basar, eds (Birkhauser, Boston)
- Abbott LF and TB Kepler (1990) Model neurons: from Hodgkin-Huxley to Hopfield. in *Statistical Mechanics of Neural Networks*, L Garrido, ed (Springer-Verlag, Berlin)
- Abbott LF and TB Kepler (1989) Universality in the space of interactions for network models. *J. Phys. A: Math. Gen.* **22**: 2031-2038
- Abbott LF and TB Kepler (1989) Optimal learning in neural network memories *J Phys A: Math. Gen.* **22**: L711-L717
- Kepler TB and LF Abbott (1988) Domains of attraction in neural networks. *J. Phys. France* **49**:1657-1662

ACTIVE RESEARCH SUPPORT

N01-AI 5000195(Kepler) 9/15/05 – 9/14/10
 NIH \$1,900,570 / year
 Multiscale Systems Immunology for Adjuvant Development

6 calendar

The major goals are to develop an integrated computational model and systematic set of experiments to study the correlation between gene expression programs in dendritic cells and T cells and the spatial reorganization of these cells during the immune response to vaccination.

5 P30 AI 064518-03 (Kepler) 7/1/05 – 6/30/10 1.2 calendar
NIH \$123204 / year
Center for Aids Research

The major goal is to provide core expertise and collaboration in computational biology and biostatistics to the community of HIV/AIDS researchers at the Duke CFAR.

5 U19 A1067798-03 (Owzar) 8/31/05 – 7/31/10 0.6 calendar
NIH \$96,000 / year
Centers for Medical Countermeasures Against Radiation - Bioinformatics

The major goal is to develop and deploy an information sharing system that will allow rapid and transparent exchange of data and their accompanying analyses among collaborators.

U01 A1 067854-03 (Haynes) 7/14/05 – 6/30/12 0.6 calendar
NIH \$38,052 / year
Center for HIV/AIDS Vaccine Immunology
R01 Aim 3 (Kepler sub-investigator)

The major goals of the CHAVI consortium are ; (1) to elucidate early viral and immunological events and host genetic factors associated with HIV-1 transmission, establishment of infection, and (partial) containment of virus replication (ii) to determine correlates of SIV immune protection in primates (iii) to design, develop, and test novel immunogens and adjuvants that elicit persistent mucosal and/or systemic immune responses to HIV-1 and SIV in humans and primates; and (iv) to evaluate HIV-1 vaccine candidates in early phase clinical trials.

38643 (Kepler, subproject to Haynes) 08/1/06 – 7/31/11 0.6 calendar
Gates Foundation \$104,490 / year
ZDAC Global HIV/AIDS Vaccine Enterprise

The major goal is to develop a database and analysis tool set for sequence and structural comparison of immunogens and antibodies.